

CLAIMS

1. A chuck for a probe station comprising:
 - (a) a first chuck assembly element having an upper surface thereon suitable to support a wafer; and
 - (b) a chuck spacing mechanism connected to said first chuck assembly element having exactly three independent supports defining the spacing between said first chuck assembly element and another chuck assembly element.
2. The chuck of claim 1 wherein said chuck spacing mechanism maintain said first chuck assembly element and said another chuck assembly element in a rigid relationship with respect to each other.
3. The chuck of claim 1 wherein each of said supports are substantially equal distant from one another.
4. The chuck of claim 1 wherein each of said supports is free from directly electrically interconnecting said first chuck assembly element and said another chuck assembly element.
5. The chuck of claim 1 wherein said first chuck assembly element is electrically connected to a signal path.
6. The chuck of claim 5 wherein said another chuck assembly element is electrically connected to a signal path.

7. The chuck of claim 1 further comprising:

- (a) said first chuck assembly element having a lower surface, said first chuck assembly element defining at least one first air path therein to said upper surface;
- (b) said another chuck assembly element having an upper surface in opposing relationship to said lower surface of said first chuck assembly element, said second chuck assembly defining at least one second air path therein; and
- (c) an interconnecting member interconnecting said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path, said interconnecting member movable with respect to at least one of said first chuck assembly element and said second chuck assembly element.

8. The chuck of claim 1 further comprising:

- (a) said first chuck assembly element having a lower surface defining at least one recess therein; and
- (b) a cover plate in overlying relationship to said lower surface of said first chuck assembly element together defining at least a portion of an air path to said upper surface suitable for providing a vacuum to said wafer supported by said upper surface.

9. The chuck of claim 1 comprising:

- (a) a first chuck assembly element having a lower surface, said first chuck assembly element defining at least one first air path therein to said upper surface;

- (b) said another chuck assembly element having an upper surface in opposing relationship to said lower surface of said first chuck assembly element, said second chuck assembly defining at least one second air path therein; and
- (c) an interconnecting member interconnecting said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path.

10. The chuck of claim 9 wherein said interconnecting member is located closer the periphery of said first chuck assembly element than a nearest member determining, at least in part, the spacing between said first chuck assembly element and said another chuck assembly element.

- 11. The chuck of claim 1 comprising:
 - (a) said first chuck assembly element having a lower surface;
 - (b) said another chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element; and
 - (c) a cover plate in overlying relationship to at least a major portion of said lower surface of said another chuck assembly element proximate said chuck spacing mechanism element.

- 12. The chuck of claim 1 comprising:
 - (a) said first chuck assembly element having a lower surface;

5 (b) said another chuck assembly element having
an upper surface and a lower surface where
the upper surface is in opposing
relationship to said lower surface of said
first chuck assembly element; and
10 (c) at least one of said supports including an
insulator having a first surface and a
second surface surrounding at least a
portion of said at least one supports
between the upper and lower surfaces of
15 said another chuck assembly element, at
least a first portion of a first surface
of said insulator in pressing engagement
with said another chuck assembly element,
at least a second portion of a second
surface of said insulator in pressing
engagement with said at least one support.

20 13. The chuck of claim 1 wherein said first
portion of said first surface and said second portion of
said second surface have an overlapping relationship over
at least a major portion of at least one of said first
portion and said second portion.

25 14. The chuck of claim 1 comprising:
 (a) said first chuck assembly element having a
lower surface;
 (b) said another chuck assembly element having
an upper surface and a lower surface where
30 the upper surface is in opposing
relationship to said lower surface of said
first chuck assembly element; and
 (c) at least one of said supports including a
generally U-shaped insulator having a
35 first surface in pressing engagement with
said upper surface of said another chuck
assembly element and a second surface in

pressing engagement with a first surface of a generally U-shaped conductive spacer, a second surface of said U-shaped conductive spacer in pressing engagement with said lower surface of said first chuck assembly element.

15. The chuck of claim 1 comprising:

(a) said first chuck assembly element having a lower surface;

(b) said another chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;

(c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and

(d) at least one of said supports including an insulator having a first surface in pressing engagement with said upper surface of said another chuck assembly element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said first surface of said insulator in pressing engagement with said upper surface is substantially directly opposing and coextensive with said second surface of said insulator in pressing engagement with said conductive spacer.

16. The chuck of claim 1 further comprising:

- (a) said first chuck assembly element having a lower surface;
- (b) said another chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element; and
- (c) said chuck spacing mechanism including an insulator having a first surface in pressing engagement with said upper surface of said another chuck assembly element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said first surface of said insulator in pressing engagement with said upper surface is less than one third the thickness of said conductive spacer in pressing engagement with said second surface.

17. A chuck for a probe station comprising:

- (a) a first chuck assembly element having a lower surface and an upper surface suitable to support a wafer, said first chuck assembly element defining at least one first air path therein to said upper surface;
- (b) a second chuck assembly element having an upper surface in opposing relationship to said lower surface of said first chuck assembly element, said second chuck

assembly defining at least one second air path therein; and

- (c) an interconnecting member interconnecting said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path, said interconnecting member movable with respect to at least one of said first chuck assembly element and said second chuck assembly element.

18. The chuck of claim 17 further comprising:

- (a) said first chuck assembly element defining a first opening in said lower surface of said first chuck assembly element; and
(b) said interconnecting member engaged with said first opening.

19. The chuck of claim 17 further comprising:

- (a) said second chuck assembly element defining a second opening in said upper surface of said second chuck assembly element; and
(b) said interconnecting member engaged with said second opening.

20. The chuck of claim 18 further comprising:

- (a) said first chuck assembly element defining a first opening in said lower surface of said first chuck assembly element; and
(b) said interconnecting member engaged with said first opening.

21. The chuck of claim 20 wherein said

interconnecting member is engaged with said first and second openings in a manner that provides a vacuum seal.

22. The chuck of claim 11 wherein said interconnecting member includes an elongate opening defined therein to interconnect said first air path and said second air path in such a manner that a vacuum may
5 be provided from said first air path to said second air path.

23. The chuck of claim 17 further comprising a chuck spacing mechanism connected to said first chuck
10 assembly element having exactly three independent supports defining the spacing between said first chuck assembly element and said second chuck assembly element.

24. The chuck of claim 17 further comprising:
15 (a) said lower surface of first chuck assembly element defining at least one recess therein; and
(b) a cover plate in overlying relationship to said lower surface of said first chuck
20 assembly element together defining at least a portion of an air path to said upper surface suitable for providing a vacuum to said wafer supported by said upper surface.

25. The chuck of claim 17 further comprising:
25 (a) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly
30 elements; and
(b) a cover plate in overlying relationship to at least a major portion of said lower surface of said second chuck assembly
35 proximate said chuck spacing mechanism element.

26. The chuck of claim 15 further comprising:

- (a) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and
- (b) said chuck spacing mechanism including an insulator having a first surface and a second surface surrounding at least a portion of said chuck spacing mechanism between the upper and lower surfaces of said second chuck assembly element, at least a first portion of a first surface of said insulator in pressing engagement with said second chuck assembly element, at least a second portion of a second surface of said insulator in pressing engagement with said chuck spacing mechanism, where said first portion of said first surface and said second portion of said second surface have an overlapping relationship over at least a major portion of at least one of said first portion and said second portion.

27. The chuck of claim 17 further comprising:

- (a) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and
- (b) said chuck spacing mechanism including a generally U-shaped insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first surface

11 a generally U-shaped conductive spacer,
a second surface of said U-shaped
conductive spacer in pressing engagement
with said lower surface of said first
5 chuck assembly element.

28. The chuck of claim 17 further comprising:

(a) a chuck spacing mechanism interconnecting
said first and second chuck assembly
10 elements and defining the spacing between
said first and second chuck assembly
elements; and

(b) said chuck spacing mechanism including an
insulator having a first surface in
15 pressing engagement with said upper
surface of said second chuck assembly
element and a second surface in pressing
engagement with a first surface of a
conductive spacer, a second surface of
20 said conductive spacer in pressing
engagement with said lower surface of said
first chuck assembly element, where said
first surface of said insulator in
pressing engagement with said upper
25 surface is substantially directly opposing
and coextensive with said second surface
of said insulator in pressing engagement
with said conductive spacer.

29. The chuck of claim 17 further comprising:

(a) a chuck spacing mechanism interconnecting
said first and second chuck assembly
elements and defining the spacing between
said first and second chuck assembly
30 elements; and

(b) said chuck spacing mechanism including an
insulator having a first surface in

pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said first surface of said insulator in pressing engagement with said upper surface is less than one third the thickness of said conductive spacer in pressing engagement with said second surface.

30. A chuck for a probe station comprising:
 - (a) a first chuck assembly element having a lower surface and an upper surface,
 - (b) said lower surface of first chuck assembly element defining at least one recess therein; and
 - (c) a cover plate in overlying relationship to said lower surface of said first chuck assembly element together defining at least a portion of an air path to said upper surface suitable for providing a vacuum to said wafer supported by said upper surface.

31. The chuck of claim 30 wherein said upper surface is suitable to support a wafer.

32. The chuck of claim 30 further comprising a second chuck assembly element wherein said second chuck assembly element is suitable to support a wafer thereon.

33. The chuck of claim 30 wherein said cover plate is substantially thinner than said first chuck assembly element.

5 34. The chuck of claim 30 wherein said cover plate is substantially coplanar with said first chuck assembly element

10 35. The chuck of claim 30 wherein said cover plate is in an overlying relationship to a major portion of said lower surface of said first chuck assembly element.

15 36. The chuck of claim 30 further comprising said lower surface of first chuck assembly element defining a plurality of recesses, each of which is concentric with respect to each other.

20 37. The chuck of claim 30 further comprising:
(a) said first chuck assembly element having said upper surface thereon suitable to support a wafer; and
(b) a chuck spacing mechanism connected to said first chuck assembly element having
25 exactly three independent supports defining the spacing between said first chuck assembly element and another chuck assembly element.

30 38. The chuck of claim 30 further comprising:
(a) said first chuck assembly element having said upper surface suitable to support a wafer, said first chuck assembly element defining at least one first air path
35 therein to said upper surface;
(b) a second chuck assembly element having an upper surface in opposing relationship to

said lower surface of said first chuck assembly element, said second chuck assembly defining at least one second air path therein; and

- 5 (c) an interconnecting member interconnecting said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path, said interconnecting member movable with respect to at least one of said first chuck assembly element and said second chuck assembly element.

39. The chuck of claim 30 further comprising:

- 15 (a) said first chuck assembly element having said upper surface thereon suitable to support a wafer;
- (b) a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;
- 20 (c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and
- 25 (d) a cover plate in overlying relationship to at least a major portion of said lower surface of said second chuck assembly proximate said chuck spacing mechanism element.
- 30

40. The chuck of claim 39 further comprising:

- 41 (a) said first chuck assembly element having said upper surface thereon suitable to support a wafer;

- 5 (b) a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;
- 10 (c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and
- 15 (d) said chuck spacing mechanism including an insulator having a first surface and a second surface surrounding at least a portion of said chuck spacing mechanism between the upper and lower surfaces of said second chuck assembly element, at least a first portion of a first surface of said insulator in pressing engagement with said second chuck assembly element, at least a second portion of a second surface of said insulator in pressing engagement with said chuck spacing mechanism, where said first portion of said first surface and said second portion of said second surface have an overlapping relationship over at least a major portion of at least one of said first portion and said second portion.
- 20 41. The chuck of claim 30 further comprising:
- 25 (a) said first chuck assembly element having said upper surface thereon suitable to support a wafer;
- 30 (b) a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing

relationship to said lower surface of said first chuck assembly element;

(c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and

(d) said chuck spacing mechanism including a generally U-shaped insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first surface of a generally U-shaped conductive spacer, a second surface of said U-shaped conductive spacer in pressing engagement with said lower surface of said first chuck assembly element.

42. The chuck of claim 30 further comprising:

(a) said first chuck assembly element having said upper surface thereon suitable to support a wafer;

(b) a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;

(c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and

(d) said chuck spacing mechanism including an insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly

element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said first surface of said insulator in pressing engagement with said upper surface is substantially directly opposing and coextensive with said second surface of said insulator in pressing engagement with said conductive spacer.

43. The chuck of claim 30 further comprising:
- (a) said first chuck assembly element having said upper surface thereon suitable to support a wafer;
 - (b) a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;
 - (c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and
 - (d) said chuck spacing mechanism including an insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said

first surface of said insulator in pressing engagement with said upper surface is less than one third the thickness of said conductive spacer in pressing engagement with said second surface.

44. A chuck for a probe station comprising:

- (a) a first chuck assembly element having a lower surface and an upper surface suitable to support a wafer, said first chuck assembly element defining at least one first air path therein to said upper surface;
- (b) a second chuck assembly element having an upper surface in opposing relationship to said lower surface of said first chuck assembly element, said second chuck assembly defining at least one second air path therein; and
- (c) an interconnecting member interconnecting said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path, said interconnecting member located closer the periphery of said first chuck assembly element than a nearest member determining, at least in part, the spacing between said first chuck assembly element and said second chuck assembly element.

45. A chuck for a probe station comprising:

- (a) a first chuck assembly element having a lower surface and an upper surface therein suitable to support a wafer;

- 5 b a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;
- 10 (c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and
- 15 (d) a cover plate in overlying relationship to at least a major portion of said lower surface of said second chuck assembly proximate said chuck spacing mechanism element.

46. The chuck of claim 45 further comprising said chuck spacing mechanism connected to said first chuck assembly element having exactly three independent supports defining the spacing between said first chuck assembly element and another chuck assembly element.

- 25 47. The chuck of claim 45 further comprising:
- (a) said first chuck assembly element defining at least one first air path therein to said upper surface;
- (b) said second chuck assembly defining at least one second air path therein; and
- 30 (c) an interconnecting member interconnecting said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path, said interconnecting member movable with respect to at least one of said first chuck assembly element and said second chuck assembly element.
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48. The chuck of claim 45 further comprising:
 (a) said first chuck assembly element defining at least one first air path therein to said upper surface;
 (b) said second chuck assembly defining at least one second air path therein; and
 (c) an interconnecting member interconnecting said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path, said interconnecting member located closer the periphery of said first chuck assembly element than a nearest member determining, at least in part, the spacing between said first chuck assembly element and said second chuck assembly element.

49. The chuck of claim 45 further comprising said chuck spacing mechanism including an insulator having a first surface and a second surface surrounding at least a portion of said chuck spacing mechanism between the upper and lower surfaces of said second chuck assembly element, at least a first portion of a first surface of said insulator in pressing engagement with said second chuck assembly element, at least a second portion of a second surface of said insulator in pressing engagement with said chuck spacing mechanism, where said first portion of said first surface and said second portion of said second surface have an overlapping relationship over at least a major portion of at least one of said first portion and said second portion.

50. The chuck of claim 45 further comprising said chuck spacing mechanism including a generally U-shaped insulator having a first surface in pressing engagement with said upper surface of said second chuck

assembly element and a second surface in pressing engagement with a first surface of a generally U-shaped conductive spacer, a second surface of said U-shaped conductive spacer in pressing engagement with said lower surface of said first chuck assembly element.

51. The chuck of claim 45 further comprising said chuck spacing mechanism including an insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said first surface of said insulator in pressing engagement with said upper surface is substantially directly opposing and coextensive with said second surface of said insulator in pressing engagement with said conductive spacer.

52. The chuck of claim 45 further comprising said chuck spacing mechanism including an insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said first surface of said insulator in pressing engagement with said upper surface is less than one third the thickness of said conductive spacer in pressing engagement with said second surface.

53. A chuck for a probe station comprising:

a first chuck assembly element having a lower surface and an upper surface thereon suitable to support a wafer;

- 25
- (b) a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;
- (c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and
- (d) said chuck spacing mechanism including an insulator having a first surface and a second surface surrounding at least a portion of said chuck spacing mechanism between the upper and lower surfaces of said second chuck assembly element, at least a first portion of a first surface of said insulator in pressing engagement with said second chuck assembly element, at least a second portion of a second surface of said insulator in pressing engagement with said chuck spacing mechanism, where said first portion of said first surface and said second portion of said second surface have an overlapping relationship over at least a major portion of at least one of said first portion and said second portion.

54. The chuck of claim 53 wherein the portion of said insulator between the upper and lower surfaces of said second chuck assembly element free from contact with said chuck spacing mechanism have generally include an upper surface that is free from contact with said second chuck assembly element.

55. The chuck of claim 53 further comprising said chuck spacing mechanism connected to said first chuck assembly element having exactly three independent supports defining the spacing between said first chuck assembly element and another chuck assembly element.

56. The chuck of claim 53 further comprising:
(a) said first chuck assembly element defining at least one first air path therein to said upper surface;
(b) said second chuck assembly defining at least one second air path therein; and
(c) an interconnecting member interconnecting said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path, said interconnecting member movable with respect to at least one of said first chuck assembly element and said second chuck assembly element.

57. The chuck of claim 53 further comprising:
(a) said lower surface of first chuck assembly element defining at least one recess therein; and
(b) a cover plate in overlying relationship to said lower surface of said first chuck assembly element together defining at least a portion of an air path to said upper surface suitable for providing a vacuum to said wafer supported by said upper surface.

58. The chuck of claim 53 further comprising:
(a) said first chuck assembly element defining at least one first air path therein to said upper surface;

- (b) said second chuck assembly defining at least one second air path therein; and
- (c) an interconnecting member interconnecting said first air path and said second air path in such a manner that a vacuum may be provided from said first air path to said second air path, said interconnecting member located closer the periphery of said first chuck assembly element than a nearest member determining, at least in part, the spacing between said first chuck assembly element and said second chuck assembly element.

15 59. The chuck of claim 53 further comprising a cover plate in overlying relationship to at least a major portion of said lower surface of said second chuck assembly proximate said chuck spacing mechanism element.

20 60. The chuck of claim 53 further comprising said chuck spacing mechanism including a generally U-shaped insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first surface of a generally U-shaped
25 conductive spacer, a second surface of said U-shaped conductive spacer in pressing engagement with said lower surface of said first chuck assembly element.

30 61. The chuck of claim 53 further comprising said chuck spacing mechanism including an insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first
35 surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said

first surface of said insulator in pressing engagement with said upper surface is substantially directly opposing and coextensive with said second surface of said insulator in pressing engagement with said conductive spacer.

62. The chuck of claim 53 further comprising said chuck spacing mechanism including an insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said first surface of said insulator in pressing engagement with said upper surface is less than one third the thickness of said conductive spacer in pressing engagement with said second surface.

63. A chuck for a probe station comprising:

- (a) a first chuck assembly element having a lower surface and an upper surface thereon suitable to support a wafer;
- (b) a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;
- (c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and
- (d) said chuck spacing mechanism including a generally U-shaped insulator having a first surface in pressing engagement with said upper surface of said second chuck

assembly element and a second surface in
pressing engagement with a first surface
of a generally U-shaped conductive spacer,
a second surface of said U-shaped
conductive spacer in pressing engagement
with said lower surface of said first
chuck assembly element.

64. The chuck of claim 63 wherein said chuck
spacing mechanism includes a central member extending
there through.

65. The chuck of claim 64 wherein said central
member is rigidly attachable to said first chuck assembly
element.

66. The chuck of claim 65 wherein said central
member is electrically isolated from said second chuck
assembly element.

67. The chuck of claim 66 wherein said central
member secures said first and second chuck assembly
elements together with said U-shaped insulator and said
U-shaped conductive spacer defining said spacing.

68. A chuck for a probe station comprising:
(a) a first chuck assembly element having a
lower surface and an upper surface thereon
suitable to support a wafer;
(b) a second chuck assembly element having an
upper surface and a lower surface where
the upper surface is in opposing
relationship to said lower surface of said
first chuck assembly element;
a chuck spacing mechanism interconnecting
said first and second chuck assembly
elements and defining the spacing between

said first and second chuck assembly elements; and

- (d) said chuck spacing mechanism including an insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said first surface of said insulator in pressing engagement with said upper surface is substantially directly opposing and coextensive with said second surface of said insulator in pressing engagement with said conductive spacer.

69. The chuck of claim 68 wherein said chuck spacing mechanism includes a central member extending there through.

70. The chuck of claim 69 wherein said central member is rigidly attachable to said first chuck assembly element.

71. The chuck of claim 70 wherein said central member is electrically isolated from said second chuck assembly element.

72. The chuck of claim 71 wherein said central member secures said first and second chuck assembly elements together with said insulator and said conductive spacer between said elements.

73. A chuck for a print station comprising:
- (a) a first chuck assembly element having a lower surface and an upper surface thereon, suitable to support a wafer;
 - (b) a second chuck assembly element having an upper surface and a lower surface where the upper surface is in opposing relationship to said lower surface of said first chuck assembly element;
 - (c) a chuck spacing mechanism interconnecting said first and second chuck assembly elements and defining the spacing between said first and second chuck assembly elements; and
 - (d) said chuck spacing mechanism including an insulator having a first surface in pressing engagement with said upper surface of said second chuck assembly element and a second surface in pressing engagement with a first surface of a conductive spacer, a second surface of said conductive spacer in pressing engagement with said lower surface of said first chuck assembly element, where said first surface of said insulator in pressing engagement with said upper surface is less than one third the thickness of said conductive spacer in pressing engagement with said second surface.

74. The chuck of claim 73 wherein said chuck spacing mechanism includes a central member extending there through.

75. The chuck of claim 74 wherein said central member is rigidly attachable to said first chuck assembly element.

5 76. The chuck of claim 75 wherein said central member is electrically isolated from said second chuck assembly element.

10 77. The chuck of claim 76 wherein said central member secures said first and second chuck assembly elements together with said insulator and said conductive spacer defining said spacing.